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Promoting Healthful Diets and Exercise: Efficacy of A 12-Week After-School Program in Urban African Americans

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Abstract

This study examined the effectiveness of a unique extracurricular after-school initiative designed to promote healthy diets and exercise in urban African Americans. The Students and Parents Actively Involved in Being Fit after-school program was offered for 12 weeks to students and their parents/guardians at an urban middle school. Specific aims of the intervention were to increase participants' vegetable and fruit intake by using

established 5 A Day for Better Health educational resource materials/activities and to affect their health-related fitness through dance, games, and fitness activities. Fifty-six children and 25 parents/guardians completed a standard battery of evaluations before and after the program. Pre-post pairwise *t* test revealed that both children and their parents/guardians showed an increase in fruit consumption and a reduction in diastolic blood pressure ($P<.05$). Moreover, children showed improvements in systolic blood pressure and fruit juice, salad, and nonfried potato consumption while parents/guardians showed a decrease in body fat, body mass index, and endurance walk/run time ($P<.05$). Overall, findings indicate that children tended to gain more diet-related benefits while parents/guardians tended to derive more fitness-related benefits. After-school programs like the Students and Parents Actively Involved in Being Fit initiative can potentially contribute to improved health levels in urban African Americans.

Healthful eating and a physically active lifestyle are desirable health habits and widely targeted for population-specific interventions to reduce disease risk among both children and adults (1). One such important population involves African Americans who, as a group, are known to be at an increased risk for obesity, hypertension, cancer, and other lifestyle-related diseases (2). It is generally recognized that efforts to promote healthful diets and exercise should start early in life (3, 4). School-based interventions are considered an important avenue for delivery of targeted health promotion initiatives in these important areas (5, 6).

Previous studies designed to evaluate various school-based diet and exercise programs often have demonstrated promising results (4, 5, 6, 7, 8, 9, 10). Although family members play an important role in development of children's health behaviors (11, 12), few of these initiatives in the past attempted to incorporate systematic elements of direct parent/guardian participation. In those that did (5, 6), the typical level of direct parent/guardian involvement was nominal only (eg, home activities, family-fun nights). Importantly, none of the studies to date has examined the potential of a school-based extracurricular health promotion initiative on both children and their parents/guardians.

Therefore, this study served to examine the effectiveness of a unique inner-city middle-school-based, extracurricular after-school program, called "Students and Parents Actively Involved In Being Fit," to foster both healthful diets and exercise patterns in urban African Americans. A distinct program feature of the Students and Parents Actively Involved in Being Fit initiative was that children and their parents/guardians were required to enroll together.

Methods

Design and implementation of intervention

The Students and Parents Actively Involved in Being Fit after-school program was conceptualized by community health advocates and implemented at an inner-city middle school in partnership with an on-site cooperating schoolteacher and university-based faculty members with research expertise in exercise physiology, nutrition, and health promotion. It was offered for a 12-week trial duration, 4 days each week, 60 to 75 minutes per session. Based on compelling scientific evidence regarding their health-risk-reduction potential, the specific aims of the intervention were to promote fruit and vegetable intake (13, 14) and increased exercise (2) in urban African-American children and their parents/guardians.

As is commonly seen with health-promotion initiatives of this nature (5, 15), a variety of social, cognitive, and behavioral strategies were enveloped and delivered in a collective format. Although not a complete list, major features of the Students and Parents Actively Involved in Being Fit after-school program included the provision of supervised dance, sport games, fitness activities, step pedometers, established 5 A Day for Better Health

Program nutrition learning activities, targeted educational handouts on nutrition and fitness, and a thematic poster-board display at the school. Moreover, each participant was asked to record daily fruit and vegetable intake and step counts on a specially designed "Students and Parents Actively Involved in Being Fit Fitness Passport." Finally, a well-known public figure made a motivational guest appearance in support of the program's goals. The school district waived the cost of community-use fees ordinarily applicable to leasing the school's gymnasium and dance rooms for the project, and an experienced schoolteacher was responsible for participant recruitment and day-to-day administration of program activities. Throughout the project duration, participants were always free to select from multiple program activities that were offered concurrently.

The dietary component of the Students and Parents Actively Involved in Being Fit after-school initiative was based on the 5 A Day for Better Health Program from the National Institutes of Health, National Cancer Institute (16). For that purpose, established educational resource materials and activities from the 5 A Day for Better Health nutrition program were obtained from the 5 A Day state coordinator and applied to the program by the cooperating schoolteacher. The exercise promotion features of the Students and Parents Actively Involved in Being Fit program were based on earlier school-based initiatives (15, 17). Certain modifications, such as inclusion of African dance activities, were made to better fit the target population. The university's human investigation committee responsible for reviewing research involving human participants approved all procedures for this study and written signed consent was obtained.

Program evaluation

A standard battery of tests was administered by specially-trained university personnel to assess basic 5 A Day dietary and health-related fitness characteristics in Students and Parents Actively Involved in Being Fit program participants both before and after the 12-week intervention period. All testing was performed on the school premises. For that purpose, body weight and height were measured using a mechanical balance-beam scale with attached telescopic height measuring rod (Seca Model 710f and 220, respectively; Seca Corp, Hanover, MD) after each subject had removed shoes and all heavy clothing. Body fat was assessed using a hand-to-hand bioelectrical impedance analyzer (HBF-306, Omron Healthcare, Vernon Hills, IL). Resting heart rate and blood pressure were evaluated following a quietly seated rest period using a 15-second radial pulse count and conventional sphygmomanometry technique (18). Blood pressure determinations were performed with an American Diagnostic Corp (Hauppauge, NY) Diagnostix 922 Series mercury sphygmomanometer, appropriately sized cuff, and Adscope 642 Sprague-Rappaport type stethoscope (American Diagnostic Corp). In addition, each subject completed a timed fitness run/walk test (1.65 miles on indoor track) and a brief set of widely used food frequency research questions to estimate fruit and vegetable intake (19). Validity and reliability data regarding this seven-item food frequency questionnaire for use with urban populations of African Americans and children has been published elsewhere (20, 21). Since young school children often have difficulty completing food frequency questions alone (22), their parents/guardians were asked to provide adult assistance. Before statistical analysis, existing questionnaire answer choices were coded using a scale of 1 to 10, where 1=never; 2=1 to 3 times per month; 3=1 to 2 times per week; 4=3 to 4 times per week; 5=5 to 6 times per week; 6=1 time per day; 7=2 times per day; 8=3 times per day; 9=4 times per day; 10=5 or more times per day. All data for children and adults were analyzed using pre-post intervention pairwise *t* tests (SPSS version 11.5 for Windows, SPSS Inc, Chicago, IL). Significance was set at the .05 level of probability.

Results and discussion

The study population consisted of 56 African-American children (18 male, 38 female; age: 11.1±1.3 years; weight: 52.3±19.3 kg) and 25 parents/guardians (all females; age: 40.6±7.7 years; weight: 81.3±21.7 kg). Table 1, Table 2 summarize the test results for both the children and parent/guardian participant groups at the beginning and end of the intervention. The overall findings suggest that the Students and Parents Actively

Involved in Being Fit after-school program benefited both children and their parents/guardians; however, the effects were not necessarily the same. While both study groups demonstrated improvements in resting blood pressure following the intervention, generally the parents/guardians tended to derive more health-related fitness benefits while their children tended to gain more diet-related benefits.

Table 1. Health-related fitness characteristics of urban African-American children and parents/guardians participating in the Students and Parents Actively Involved in Being Fit program

Measure	Preintervention	Postintervention	Significance (two-tailed)
Children	← mean±standard deviation→		
BMI ^a	22.5±6.3	22.6±6.2	.446
Body fat (%)	29.7±7.3	29.4±7.4	.428
Resting HR ^b (bpm ^c)	81.8±10.6	77.7±13.9	.090
Resting SBP ^d (mm Hg)	116.7±7.0	106.6±16.5	.000**
Resting DBP ^e (mm Hg)	75.0±6.2	68.2±10.1	.000**
Walk/run time (min)	23.46±6.35	22.86±6.05	.455
Parents/guardians			
BMI	30.5±8.8	30.0±8.5	.002**
Body fat (%)	35.3±6.9	34.3±7.1	.004**
Resting HR (bpm)	78.1±8.9	79.3±6.1	.621
Resting SBP (mm Hg)	124.9±6.9	123.3±12.7	.446
Resting DBP (mm Hg)	81.6±8.3	76.3±9.6	.031*
Walk/Run time (min)	29.70±6.14	25.62±4.47	.007**

^aBMI=body mass index, calculated as kg/m².

^bHR=heart rate.

^cbpm=beats per minute.

^dSBP=systolic blood pressure.

^eDBP=diastolic blood pressure.

**P*<.05.

***P*<.01.

Table 2. 5 A Day for Better Health Program nutrition questionnaire responses for urban African-American children and parents/guardians participating in the Students and Parents Actively Involved in Being Fit program

Food Frequency Questionnaire Items ^a	Preintervention	Postintervention	Significance (2-tailed)
Children	← mean±standard deviation→		
In the past month, about how often did you drink 100% orange juice or grapefruit juice?	5.13±2.56	4.96±2.74	.667
In the past month, about how often did you drink other 100% fruit juices, NOT counting fruit drinks?	3.94±2.11	4.83±2.37	.035*
In the past month, about how often did you eat green salad (with or without other vegetables)?	3.42±1.97	4.58±2.80	.003**
In the past month, about how often did you eat french fries or fried potatoes?	3.60±1.54	3.92±2.79	.278

In the past month, about how often did you eat baked, boiled, or mashed potatoes?	2.79±1.66	3.70±2.33	.005**
In the past month, about how many servings of vegetables did you eat, NOT counting salad or potatoes?	3.96±1.69	4.36±2.20	.276
In the past month, about how many servings of fruit did you eat, NOT counting juices?	4.45±1.99	5.64±2.43	.002**
Parents/guardians			
In the past month, about how often did you drink 100% orange juice or grapefruit juice?	3.96±1.67	3.60±1.71	.308
In the past month, about how often did you drink other 100% fruit juices, NOT counting fruit drinks?	4.64±2.39	4.24±2.35	.526
In the past month, about how often did you eat green salad (with or without other vegetables)?	4.40±1.92	5.04±1.77	.107
In the past month, about how often did you eat french fries or fried potatoes?	2.72±1.24	2.68±1.41	.904
In the past month, about how often did you eat baked, boiled, or mashed potatoes?	2.96±1.40	3.40±2.57	.419
In the past month, about how many servings of vegetables did you eat, NOT counting salad or potatoes?	4.44±1.66	5.08±1.80	.144
In the past month, about how many servings of fruit did you eat, NOT counting juices?	4.16±1.82	5.12±2.16	.025*

^aQuestionnaire answer choices were coded using a scale of 1 to 10, where 1=never; 2=1 to 3 times per month; 3=1 to 2 times per week; 4=3 to 4 times per week; 5=5 to 6 times per week; 6=1 time per day; 7=2 times per day; 8=3 times per day; 9=4 times per day; 10=5 or more times per day.

* $P<.05$.

** $P<.01$.

The present findings expand observations by Colchio and colleagues (17) supporting the claim that targeted after-school programs can offer an effective means of delivering key health promotion messages in urban minority populations. As is often seen in the literature (2), modest improvements in resting blood pressure in the parent/guardian group were accompanied by reductions in body mass index (BMI), body fat, and improved fitness (4-minute reduction in walk/run time). Estimated fruit and vegetable intake levels remained largely unchanged. For the children, on the other hand, reductions in diastolic (−6.8 mm Hg) and systolic (−10.1 mm Hg) blood pressure were accompanied by a higher level of fruit and vegetable consumption, and without any changes in other health-related fitness measures. Findings from previous school-based exercise programs suggest beneficial effects on blood pressure can occur in children both with or without changes in body composition (BMI, body fat) or fitness level (4, 7). Similarly, an increase in fruit and vegetable intake in itself has a beneficial effect on blood pressure (23). Taken together, it is likely that reductions in resting blood pressure noted for the children resulted from the combined effects of the exercise and dietary components of the Students and Parents Actively Involved in Being Fit initiative. More studies are warranted to examine the ability of various dietary and exercise patterns, alone or in combination, to affect blood pressure in children.

Because lifestyle-related health behaviors are significantly affected by positive parental modeling and taking part in exercise and healthful eating (11, 12) compared to other school-based interventions (4, 5, 6, 7, 8, 9, 10), a

unique feature of the Students and Parents Actively Involved in Being Fit after-school initiative was that enrollment was only open to children and their parents/guardians who agreed to directly take part together. It is of interest to note that the adult participant group in the Students and Parents Actively Involved in Being Fit program was all female and many of them were overweight or obese. Adult urban African-American women have been identified as an important population for which physical activity/fitness enhancement strategies are needed (24). It appears that the Students and Parents Actively Involved in Being Fit program provided a unique framework and regular opportunity for these women to work on their health-related fitness, which may help explain the greater improvements in this area noted for the parent/guardian group.

On the other hand, it is also important to acknowledge that work-related conflicts prevented some parents/guardians at times from full participation in the Students and Parents Actively Involved in Being Fit after-school program. Perhaps an early-morning program before the start of regular classes may provide an alternative time to offer a similar school-based initiative. Whichever time might be better, it is recommended that future research examining adult participation in school-based health promotion programs should not only focus on relevant outcomes in children (25), but also on the effects in the parents/guardians themselves.

The findings of this study are limited by a number of factors, including the relatively small sample size, absence of control groups, and the short 12-week intervention duration. Similarly, while the brief food frequency questionnaire employed in this study is used with all national 5 A Day for Better Health Program-funded research sites, only limited data exists about its adequacy as a dietary assessment tool in specific population segments. Two previous studies involving urban African Americans (20) and young school children (21) have shown that compared with other select reference standards, fruit and vegetable intake levels are likely to be overestimated using this particular dietary assessment technique.

Conclusions

The findings of this preliminary study indicate that urban African-American children and their parents/guardians benefited from a short-term after-school program that targeted healthful diets and exercise. Generally, the adults tended to gain more health-related fitness benefits while the children showed more diet-related improvements. Although most of the observed changes seem modest at first glance, if similar outcomes can be more widely achieved, after-school initiatives like the present one are likely able to make a viable contribution to improved health levels in urban African Americans. Further studies are warranted to test interventions that target both African-American children and their parents simultaneously.

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